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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/847,479	05/02/2001	Jeffrey J. Brown	FIS920010077US1	6231

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MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
BARRECA, NICOLE M	
ART UNIT	**PAPER NUMBER**
1756	

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/847,479	BROWN ET AL.	
	Examiner	Art Unit	
	Nicole M. Barreca	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *13-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's election with traverse of Group I, claims 1-12 in Paper No. 12/29/03 is acknowledged. The traversal is on the ground(s) that there can be no undue burden on the examiner when the examiner has already performed a complete search as a criterion for the office action dated 5/21/2003. This is not found persuasive because the inventions of Groups I and II are distinct and have acquired a separate status in the art because of their divergent subject matter. The search required for Group I is not required for Group II. In addition each individual search encompasses not only the subclass that the invention is classified in, but numerous other subclasses. In addition, the search performed previously is no longer applicable, as the claims have been amended since that time. The applicant also argues there can be no undue burden on the examiner when a search is performed for a method for making set of claims versus the product resultant from that method because if there is no prior art found for the method, it would be difficult for the examiner to declare that an additional burden is imposed for searching for the product made by that method. This is not found persuasive because the patentability of a product does not depend on its method of production. See MPEP 2113.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 13-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 12/29/03.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 7, 11 and 12 recite "a critical dimension that is below 100 nm ". This claim does not meet the description requirement because the phrase "below" has no lower limit and causes the claim to read outside of the disclosed range. While the claims are supported for some dimensions less than 100 nm, such as 75 nm (p.10 of specification), the claims are not supported for all critical dimensions less than 100 nm. See MPEP 2163.05, III.

The applicant argues that the "plain language meaning" of the independent claims precludes an interpretation that all dimensions below 100 nm are being claimed. The examiner disagrees and maintains that one of ordinary skill in the art would not be able to determine the lower end point of the applicant's claimed range. While one of ordinary skill in the would be able to determine that a dimension of 75 nm would read on the applicant's invention because of teachings in the specification, how would they be able to determine if, for example, 40 nm reads on it?

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 4-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear if the one layer of or deposited on the wafer etched with the second set of conditions in claim 4 is the same layer as the first mask etched with the first set of conditions in claim 1 or, if it is a different layer underlying the first mask.

Response to Arguments

7. Applicant's arguments, see p.10, filed 12/29/03, with respect to the rejection(s)of claim(s) 1,2, and 7 under 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. In addition, the 103 rejections of claims 3, 8, 11 and 12 have been withdrawn in response to the applicant's proper statement of common ownership found on p.12, 3rd full paragraph. However, upon further consideration, a new ground(s) of rejection is made in view of Yauw and Huang.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yauw (6599437).

10. Yauw discloses a method for etching an organic coating layer which provides control over the etched feature critical dimension as well as critical dimension uniformity across the substrate surface (CD shift range) despite the difference in spacing between etched features in both dense and isolated areas. The entire thickness of the organic coating is etched to an endpoint in the main etch, followed by an overetch step. The power applied to bias the substrate in the overetch is less than the power applied to bias the substrate in the main etch (col.3, 20-57). The combination of the etch chemistry and application of less substrate bias in the overetch step produces more rapid etching of isolated feature, balancing the slowed etch rate in the dense areas during the main etch. CD shift range is reduced as a result of this balancing effect (col.4, 12-28). The wafer is biased with RF source 130 (i.e. tuning parameter) (col.7, 33-34). See also Table 1 for the first and second etching conditions. The reference is silent on the critical dimension and does not disclose that the critical dimension is less than 100 nm. However critical dimension is dependent on various process conditions, such as photoresist type, exposure wavelength and etching conditions and is therefore a result-effective variable. It would within the ordinary skill of one in the art to determine the desired critical dimension in the method Yauw by routine experimentation and to have critical dimension be less than 100 nm, if required, because critical dimension is a result effective variable and the discovery of an optimum value of a result effective variable is ordinary within the skill of the art, as taught by *In re Boesch* (617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang (5837428).

12. Huang discloses an etching method. Photoresist layer 20 is deposited on focusing layer 18, electrode material layer 16 and dielectric layer 14 (col.6, 3-18). The photoresist layer is patterned and subjected to a first etch or trimming process. The trim etch uses a gas composition comprising oxygen (5-20 sccm) and nitrogen (5-10 sccm) (flow ratio of oxygen/nitrogen =1.0-2.0). The pressure is from about 4 to about 10 mTorr and the RF power is from about 200 to about 400 W (col.8, 47-col.9, 1). The trimmed resist mask is then used to etch the underlying layers. See Fig 1-4 and col.9-10. Huang teaches that the trimmed mask is about .25 microns (250 nm) and does not disclose that a critical dimension of 100 nm or less. However critical dimension is depend on various process conditions, such as photoresist type, exposure wavelength and etching conditions and is therefore a result-effective variable. One of ordinary skill in the art would expect that if different exposure conditions were used and a smaller starting photoresist pattern was produced, then the trim etching conditions taught by Huang would result in a smaller final critical dimension. It would within the ordinary skill of one in the art to determine the desired critical dimension in the method Huang by routine experimentation, such as using different exposure conditions to produce smaller starting photoresist pattern, and to have critical dimension be less than 100 nm, if required, because critical dimension is a result effective variable and the discovery of an optimum value of a result effective variable is ordinary within the skill of the art, as taught by *In re Boesch* (617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Allowable Subject Matter

13. Claims 1-3 and 7-10 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action. Claims 4-6 would also be allowable if rewritten or amended to overcome the 35 U.S.C. 112, second paragraph rejection of claim 4.

14. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach or suggest a method for forming a circuit wherein a first mask (at a lower dimension) is subjected to a trimming process to adjust the pattern dimensions (to a higher resolution) and wherein the trimming process includes a tuning parameter to independently control line width variation tolerance of isolated features relative to nested features.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole M. Barreca whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday (8:00 am-6: 30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nicole M. Barreca
Examiner
Art Unit 1756

3/25/04